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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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GROWER SUMMARY

Headlines

- MRS released two new processing varieties, Glen Ericht (provisional name for 99111B2) and Glen Cally (provisional name for 99111A1), which are highly tolerant to *Phytophthora* root rot.

- Marker assisted selection has been deployed into the breeding programme early in to screen for resistance to *Phytophthora* root rot. This will eliminate undesirable germplasm early in the breeding process and shorten the timescale required to develop new varieties. The first results are expected by the end of 2010.

- New selection 0485K-1 had outstanding fruit quality in the SCRI plots and is recommended for on-farm trials.

- New selections 0433F2, 0403F6 and 0453C4 performed exceptionally well in SCRI trials.

Background and expected deliverables

In 2009, the UK raspberry industry formed a consortium to fund the National Raspberry Breeding Programme for five years. The objective of the programme is to produce improved raspberry varieties selected for particular markets and cultural practices.

Detailed specifications of the objectives can be found in the revised objectives document. A summary of the expected deliverables from this work will include:

- New potential varieties suitable for both fresh market production (including season extension through protected cropping) and machine harvesting for processing.
- New hybrids with improved pest and disease resistance, especially to *Phytophthora rubi* (root rot).
- Development of new varieties will be aided by the deployment of marker assisted selection, developed at SCRI, substantially reducing the time required to produce a new cultivar.
- Development of new primocane-fruiting varieties.
- Evaluation of promising selections under commercial conditions in grower trials.

Summary of the project and main conclusions

SCRI Trials

This year the following plots were under evaluation at SCRI:

- 20 genotypes in a protected site of replicated 5-plant plots (plot J25), in its third and final season.
- 30 genotypes in a protected site of replicated 5-plant plots (plot J26), in its second season.
- 30 genotypes in a protected site of replicated 5-plant plots (plot J7), in its first season.
- 18 genotypes in a machine-harvest site of 20-plant plots in its second season.
- Approximately 4000 seedlings from the 2007 crossing programme.

- A summary of the characteristics of key selections, including those already identified for on-farm trials are summarised in Tables 1, 2 and 3.

- The yield from SCRI of the on-farm selections are compared with Glen Ample, Tulameen and Octavia in Figures 1, 2 and 3.

Table 1: Plot J25 (third season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
9350F3	6357.5	5.4	8.7	12/07/10	Mid-late season. Attractive, large conical fruit, excellent display, flavour sweet + mild this season, high yield
0304F6	5171.9	5.2	11.8	12/07/10	Mid-late season. Large pale meaty fruit, strong sweet flavour with an acid edge, great display on long, strong laterals
Glen Ericht 99111B2*	4846.2	5.1	9.6	08/07/10	Early-mid season, dark fruit, slightly soft at end of season, very upright primocane, contiues to display strong tolerance to *Phytophthora*,
Glen Fyne	4981.5	5.0	10.2	12/07/10	Mid season. Fruit is firm with good cohesion and has a sweet and aromatic flavour. Canes produce a high yield of good quality fruit
Tulameen	2495.5	5.1	11.8	12/07/10	Sweet, strong flavour but rough, lumpy and soft all season
Octavia	4596.8	5.4	9.9	16/07/10	Very late, enormous fruit, pale, tearing collar, good aroma but sharp

*Selections currently identified for on-farm trials

Table 2: Plot J26 (second season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
0453C4*	4115.0	4.8	11.2	06/07/10	Very early. Glossy, firm, good shelf-life, great sweet + floral flavour all season, good habit + display, small at end of season
0453C5	3430.4	4.7	9.5	06/07/10	Early. Very attractive in a punnet, good flavour all season, very firm, great display
0433F2*	3422.8	5.1	11.2	12/07/10	Glossy conical fruit – looks like Tulameen, sweet + aromatic
0433H-3	5098.1	4.8	9.4	08/07/10	Early season. Sweet + floral flavour, consistent through the season, firm, slightly dull, smaller at end of season
9911C-1*	3649.8	6.1	10.1	08/07/10	Early season. Large fruit with prominent drupes, sweet + floral all season, solar damage early season
Glen Ample	3645.0	5.3	9.9	08/07/10	Very poor example of Ample. Short laterals and petioles, very difficult to pick, flavour acid for Ample
Glen Fyne	2971.7	5.4	11.6	12/07/10	Mid season, large fruit, sweet + juicy, good yield but root rot symptoms in plot
Octavia	4111.6	6.4	9.9	19/07/10	Late season. Fruit clustered on very short petioles, sharp but nice aroma, some mildew on primocane
Tulameen	3185.1	5.1	11.7	16/07/10	Variable establishment, 4/5 plants with very poor quality – rough + crumbly, bleeding in punnet, superb flavour

*Selections currently identified for on-farm trials

Table 3: Plot J7 (first season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
0485K-1	3631.0	6.0	11.1	12/07/10	Mid-season. Large, conical + glossy fruit consistent quality all season. Popular with visitors. Easy + quick to pick. Has *Gene H*. A clear winner in 2010
0485K-2	3123.6	5.4	10.3	12/07/10	Very bright shiny and long conic like sister K-1 better shelf-life but slightly less flavour. Has *Gene H*
00123A7*	2999.3	6.2	12.0	12/07/10	Very good quality and popular flavour in 2010. High brix levels all season
0019E2*	1862.5	6.8	10.1	19/07/10	Late season. Enormous fruit size. Top laterals breaking at node and collapsing
0534RB1	2714.9	6.9	12.3	16/06/10	Late season. Enormous fruit size – first pick >8g. Long laterals >1m, but not collapsing
04108F-5	3908.3	4.7	11.5	16/07/10	Shiny pale fruit is pretty in a punnet, excellent shelf-life, stays firm and bright after 7 days
0015F1	2874.5	5.4	10.5	16/07/10	Good display, long strong laterals, upright primocane makes fruit visible and easy to pick, good shelf-life
Glen Doll	2199.2	5.4	11.6	19/07/10	Firm and dry but sweet and fruity. Large fruit this season, well displayed on long laterals
Glen Ample	2715.1	5.1	9.8	12/07/10	Flavour slightly acidic for Ample but typically easy to pick and manage
Tulameen	1757.3	5.5	11.7	19/07/10	Good flavour and quality in this plot, fruit a bit too soft

*Selections currently identified for on-farm trials

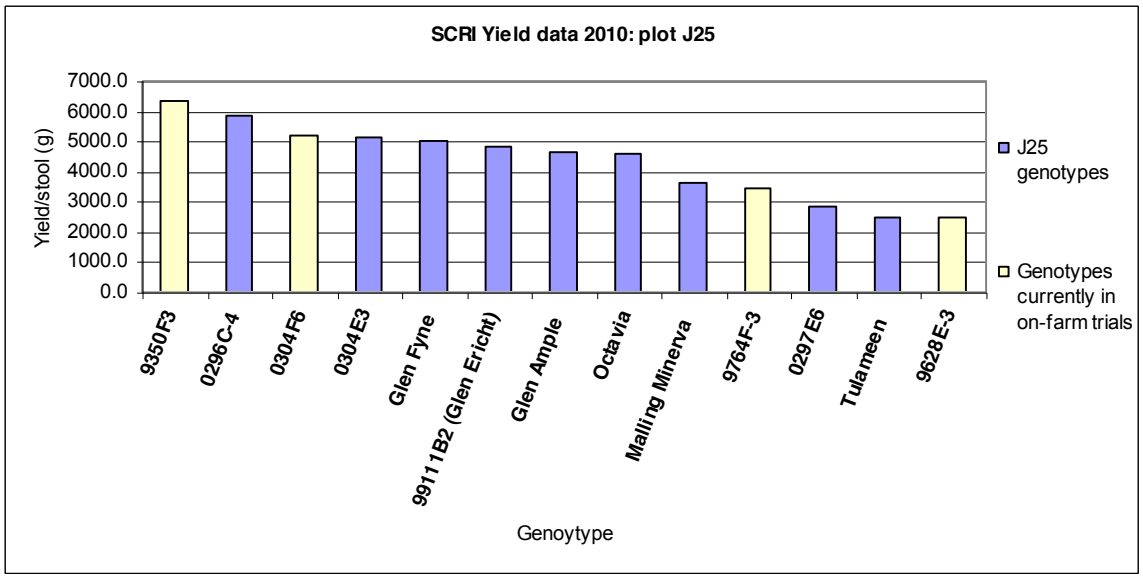

Figure 1. Mean yield of selections in SCRI plot J25

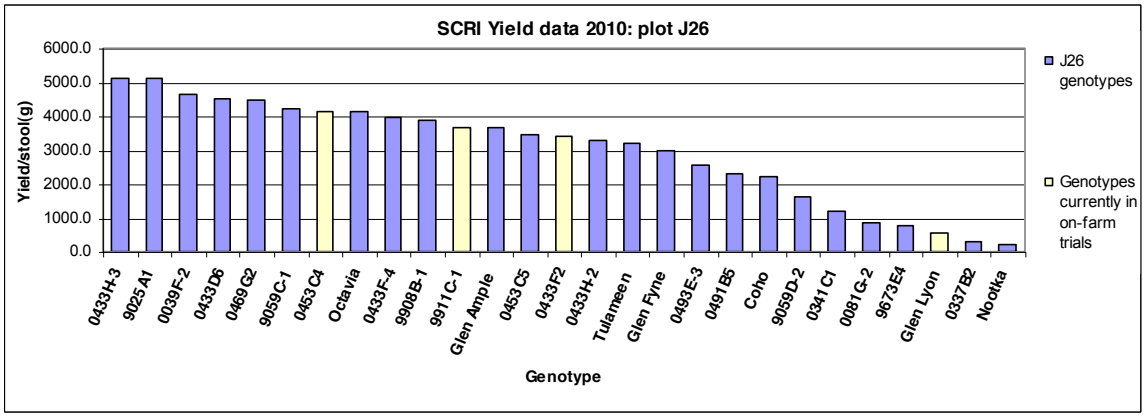

Figure 2. Mean yield of selections in SCRI plot J26

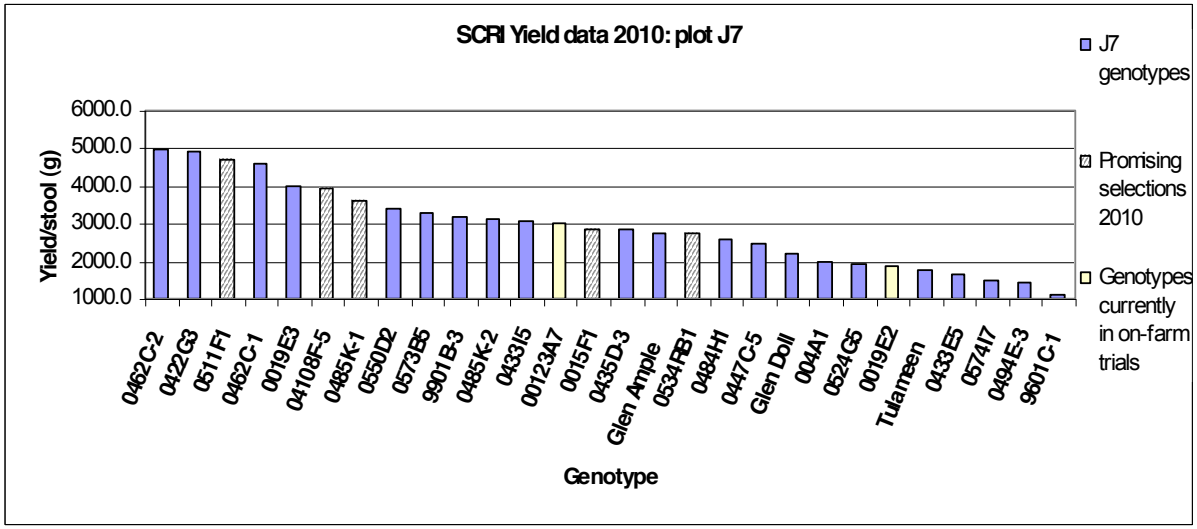

Figure 3. Mean yield of selections in SCRI plot J7

Main Conclusions

- Glen Fyne performed very well in SCRI trials producing a high yield of fruit with exceptional flavour. This has been consistent for the last two seasons. First plants became available from propagators in spring 2008.
- *Phytophthora* tolerant selections 99111A1 (provisionally named Glen Cally) and 99111B2 (provisionally named Glen Ericht) are continuing to perform well in protected and open-field machine-harvested plots. Both are productive with good fruit quality suitable for processing. Selection 99111A1 appears to be acutely susceptible to RBDV at SCRI, whilst 99111B2 remains RBDV-free. Propagation licenses are held by Trade Solutions and RW Walpole. MRS applied for PVR in 2009.
- *Selection* 00123A7 was planted in on-farm trials at six UK sites and produced a small crop in 2009. This performed very well in SCRI plots in 2010 but was discarded from the trial list in July.
- *Selection*s 0019E2 and 9911C-1 were planted in farm trials in 2008 and early trial data from one site was very promising.
- *Three ne*w selections 9350F3, 0453C4, 0304F6 and 0433F2 stood out in SCRI plots with good eating quality and generated lots of interest from various visitors to SCRI during the fruit season. These selections are currently undergoing micropropagation and will be available for planting in on-farm trials in spring 2011.

Financial benefits

The release of varieties with improved fruit quality and yield will result in increased class 1 fruit and increase growers' productivity. New varieties with pest and disease resistance will lead to a reduction in pesticide applications, the costs associated with these and the financial implications of fruit rejections occurring as a result of pesticide residues. With the possibility of a loss of agrochemicals as a result of EU-led policy changes, it is essential that the industry has access to resistant germplasm into the future.

Action points for consortia members

- Continue commercial propagation of Glen Fyne.
- Propagate Glen Ericht and Glen Cally.
- Plant new selections 9350F3, 0453C4, 0304F6 and 0433F2 in on-farm trials.
- Propagate new selection 0485K-1 for on-farm trials.

SCIENCE SECTION

Introduction

Raspberries have been bred at Mylnefield, Dundee, Scotland since the 1950's and the development of cultivars crucial to the industry's prosperity has continued at SCRI to the present time. The raspberry breeding programme at SCRI has been phenomenally successful and is perhaps best known for the 'Glen' series of cultivars which are grown throughout the world (Jennings and Brennan 2002).

Commercial funding between 1993 and 2000 saw the breeding programme focus upon the development of machine harvestable cultivars for processing. However, it is the fresh market sector that now represents the main area for potential growth in both field and season extension contexts. Although machine harvestable types are still under development, the primary focus is on the fresh market, selecting and developing cultivars suitable for production under a protected cropping system. This will help in identification of adapted germplasm early in the selection process, prior to commercial trialling.

Materials and Methods

The programme is based on recurrent selection. Each year selections are made which form the basis of the next generation of crossing. As new variability for particular traits is needed, elite cultivars and selections from outside the programme are included as parents. Each year, approximately 100 crosses are made, producing 100-200 seedlings per family. With variation in germination rates, the programme begins with ~12,000 seedlings. Based on their pedigree, families will be segregating for different characteristics.

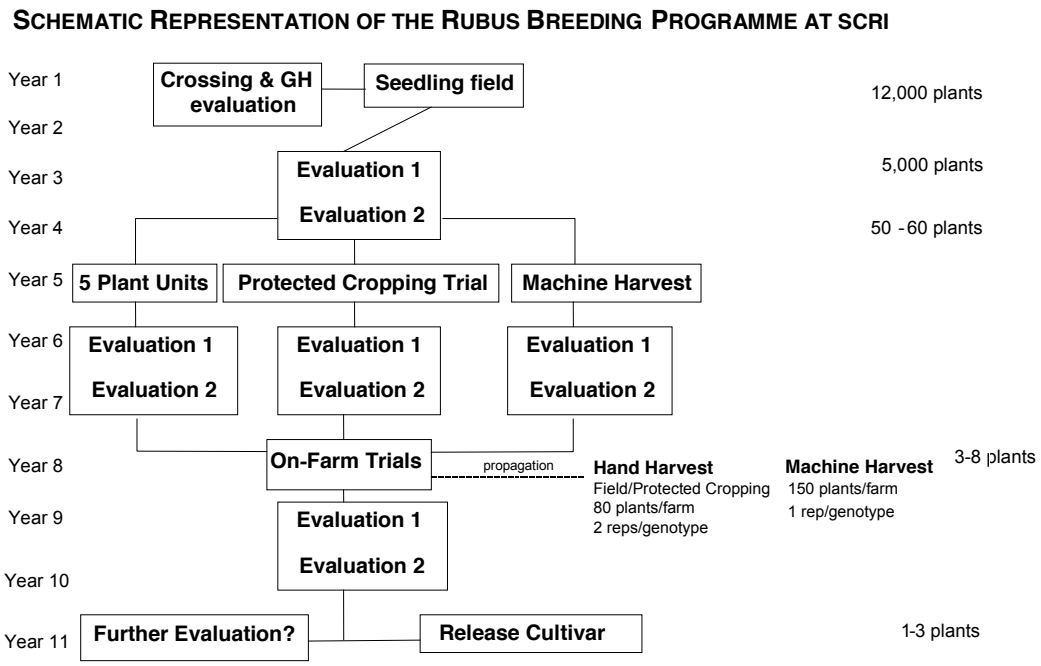

Figure 4 Breeding schedule

Crossing

All hybridizations in the programme are made out of season in an insect-proof glasshouse. Parents for hybridisation are identified and lifted in late autumn and given a chilling period of 7 weeks at 2^{o}C in a vernalisation room, after potting on into 15 litre pots with a peat-based compost mix The plants are then moved into an insect-proof glasshouse where the temperature is raised gradually from 10^{o}C to 20^{o}C over a three week period. Daylength is set at 16 hours. Plants break bud, produce laterals and begin to flower approximately four weeks later. Irrigation and fertigation are automated through a DI16 Dosatron.

Open flowers are collected into a Petri-dish for use as a pollen source, dried at room temperature and stored with a desiccant at 4^{o}C. Closed flower buds are emasculated with a scalpel and are ready to pollinate once the stigma have become receptive (approx. 48 hours after emasculation). The pistil is pollinated with an artist's paint brush (Sable, size 5). All tools and hands are sterilized with absolute alcohol between crosses and all excess flower buds are removed to minimize pollen transfer in the glasshouse environment, therefore pollen bags are not required. Parent plants are sprayed for pests and diseases as appropriate for the duration of crossing.

Seed extraction

Fruit from each family is collected when ripe and left in a Pectinase solution overnight at room temperature. The pulp is separated from the seed by blending the mixture for 10 seconds in a domestic blender. The mixture is left to settle for one minute; viable seed will

sink to the bottom and pulp and non-viable seed will float to the top. The pulp is decanted from the viable seed. The seed is rinsed by filling the jug with tap water, left to settle and decanted. The rinse cycle is repeated three times, until the tap water is clear. The seed which is clean and free of any pulp, is left to dry overnight on filter paper. Dry seeds are stored in glassine bags (100 x 70mm) with a dessicant at 4^{o}C.

Seed scarification

Up to 1000 seed/family are scarified in acid, assuming 15-20% germination. Remaining seed is stored in case of poor germination. Seed must be clean and dry before scarification in acid. Seed is transferred to a boiling tube (~500 seed/tube) with concentrated sulphuric acid for exactly 20minutes. Seed is rinsed by pouring the seed and acid through a metal sieve, secured by a retort stand, and then rinsing with tap water for 10 minutes. Seed is submerged under the water during this period. Seed is then submerged in calcium hypochlorite solution for 6-10 days. The seed is stirred every day and the solution is changed once during this period. Once the seed coat has been scarified with acid, it is important that the seed is not left to dry out.

Stratification and germination

Seed is rinsed under tap water for 10 minutes and mixed with damp vermiculite. The mixture is stored in a sealable bag at 4^{o}C for six weeks.

After this period, the seed and vermiculite is treated with GA_3 (3ppm) and left at room temperature overnight.

The seed and vermiculite is sown onto Bulrush Brown/Black peat in a seed tray and covered with a fine layer of dry vermiculite. The trays are incubated at 20^{o}C in Corex incubators, specially constructed at SCRI, to maintain heat and humidity. Seeds begin to germinate within 7 days.

Spines

Spined genotypes are eliminated early at the germination stage of the seedlings. The spine glands can be seen around the leaflets at the cotyledon stage. These are removed from families which are segregating for spines, leaving only the spine-free plants for further evaluation. All progeny are kept from crosses where plants are expected to be all spiny, due to the parents used.

Aphid resistance

Seedlings in the breeding programme are screened for the gene A_{10}, conferring resistance to four biotypes of the large raspberry aphid (*Amphorophora idaei*). After the segregating families are screened for spinelessness, the remaining seedlings are pricked out and potted-on into FP9 pots with compost mix containing slow release fertilizer. These are reared in a

glasshouse with a 16 hour day length at 20°C. Once plants have produced 3-4 true leaves, they are ready to be inoculated with biotype two of *A. idaei*. Two apterous *Amorphora idaei* aphids are placed on each test plant alongside controls Malling Jewel (susceptible) and Autumn Bliss (resistant). The plants are scored after 10-14 days; susceptible plants will have a feeding colony versus resistant plants which will have no reproducing population. Susceptible progeny in segregating families are discarded. Aphids are cultured and supplied by entomologists on-site at SCRI.

Field planting

After spiny and aphid-susceptible genotypes are eliminated, the remaining seedlings (~5000 individuals) are hardened-off for field planting. If the ground conditions are appropriate the seedlings are planted in late autumn, otherwise they are held in a Tygan structure until the following spring. This is a 9m, semi-permanent single-span tunnel, covered with an insect-proof mesh, instead of polythene.

Seedlings are planted 0.8m apart, with a 0.8m gap between families.

All outdoor raspberry breeding plantations at SCRI are prepared and managed with the same practice. Raised beds are formed, 2.5m apart, with a potato bed-maker. Grass seed is sown in the alleyways. Plants are supported with a traditional post and wire system and old floricanes are cut out and new primocanes are laced-in in the traditional manner. Overhead irrigation is supplied as needed. A minimal spray programme is applied as follows in order to select for resistance/susceptibility to pathogens.

Table 4. Spray programme

Pest/Pathogen	Control - Active	Rate/ha	Application
Weed control	Dichlobenil	5L	February
Root rot	Fluazinam	1.5L	Spring and autumn
Cane midge	Chlorpyrifos	1L	Monitored
Raspberry beetle	Chlorpyrifos	1L	Monitored

Breeding and selection for tolerance to raspberry root rot

An important objective of the breeding programme is the development of cultivars with tolerance to raspberry root rot, caused by the fungus *Phytophthora fragariae* var. *rubi*. Currently, 20% of the crossing programme is dedicated to breeding for tolerance to the disease, where one parent with known resistance or tolerance is crossed with genotypes with good agronomic characteristics. Progeny are planted alongside susceptible controls in an infested plot at SCRI. Seedlings are evaluated once these controls show symptoms of

root rot, usually around 3-5 years after planting. Tolerant selections require further evaluation for fruit quality and yield before a cultivar can be released.

First stage selection

These plants are evaluated for two fruiting years for basic fruiting characteristics (size, shape, flavour, colour, firmness, shelf life). Around 1% of the seedlings (30-50 individuals) are selected for small replicated trials of protected hand harvest plots and, where appropriate, machine harvest plots at SCRI. Once selected, root from these genotypes are lifted from the plot and given a six week vernalisation period at 4^{o}C. Root from each selection is then sown into a shallow tray on top of Bulrush compost and germinated with bottom heat in a glasshouse set at 20^{o}C, 16 hours daylength. These are evaluated for a further three fruiting years, alongside commercial cultivars, where more detailed assessments are made on fruit quality, yield, plant habit and tolerance to pest and disease.

SCRI polytunnel

Haygrove polytunnels have been used since 2004 to evaluate germplasm under a protected cropping system with the objective of identifying suitable cultivars early in the selection process. The 100m x 100m structure is a Spanish-style Haygrove SMART series multi-bay tunnel with thirteen bays, each spanning 7.8m, built on 2m legs. Tunnels are covered with standard 150mu Visqueen polythene. Raspberry tunnels have three rows per bay, 2.5m between rows with a 2.8m leg row. Alleyways are grassed and legs rows covered with UV-stable fabric mulch (Phormasol) to control weeds. Raised beds are formed before planting. Irrigation and fertigation is controlled by a D8 Dosatron and is fed through Ram Light tape under the bedding polythene. A commercial fertigation programme, standard for established plots of 'Glen Ample' and 'Tulameen', is used:

Table 5. Fertigation programme

	Rate (L/ha/week)	**Start date**	**Duration**
N-P-K 3-2-9	80	May	16 weeks
Potassium sulphate	125	June	8 weeks

A 4m high Paraweb windbreak is erected on the west side of the tunnels to protect the structure from wind damage.

Plant material

Selections from the breeding programme are planted in replicated five-plant plots. Plants are placed at 0.8m spacing with a 0.8m gap between each genotype, giving two genotypes

between each post. A continuous row of 'Glen Ample' was planted in the westernmost row of the raspberry plot as a guard.

Plants are supported with a post and wire system. A double post system is erected at row ends and mid-row to give extra support. Wire support is put in at three heights since there is large diversity between genotypes of establishment and vigour.

Chemical application

Generally, breeding plots at SCRI are kept free of chemical application to assess resistance/susceptibility of pest and disease. After discussions in 2004, it was felt that the protected plots of raspberries should be kept free of any pathogens in order to observe optimum fruit quality and yield. The basic spraying programme is below. Additional applications will be based on observations and presented in the Results section.

Table 6. Spray programme

Pest/Pathogen	Control - active i	Rate/ha	Application	
Root rot	Fluazinam	1.5L	Spring and autumn	Standard
Raspberry beetle	Chlorpyrifos	1L	First open flowers	Monitored
Two spotted spider mite	Spidex (*Phytoseiulus persimilis)*		Fruit season	Monitored

Assessments

Several physical fruit quality characteristics are assessed on an arbitrary score of one to nine, where one equals poor or low intensity and nine equals excellent or high intensity, as follows:

Table 7. Characteristic scores

Characteristic		
Flavour	1 = bad/off flavour	9 = fruity + aromatic with a balance of sweet/acid
Shape	1 = globular	9 = long conic
Colour	1 = v. pale	9 = v. dark/purple
Firmness	1 = v. soft	9 = v. firm
Collar	1 = v. uneven	9 = v. even with good cohesion
Pick	1 = v. difficult to plug	9 = falls off when touched
Vigour	1 = low vigour <1m	9 = v. vigorous >3m
Plant habit	1 = collapsed cane	9 = v. upright cane
Cane diseases	1 = no symptoms	9 = severe symptoms
Overall score	1 = completely inadequate	9 = perfect agronomical traits

- Total yield for each five-plant plot is picked and calculated as yield per stool.
- Fruit size is measured in grams by taking the average weight of ten fruit.
- Season is assessed by recording dates of first flower, first fruit, first pick, 50% pick and final pick.
- Number of fruit per lateral is counted on laterals from the top, middle and bottom of the plot.
- Brix is measured with a Palette 100 PR-100 digital refractometer.
- Shelf-life is measured by picking 10 fruit and storing in a lidded punnet at 4C for seven days. Post harvest evaluations are recorded with on an arbitrary scale, as above, on brightness, uniformity, colour, firmness, mould and bleeding.
- Additional notes are recorded on flavour description, uniformity, display, comparison with control varieties, disease infection and other identifying features.

Advanced selections

All the fruit data is collated and promising selections (usually one or two genotypes) with consistent desirable characteristics are identified as potential new cultivars, and are thus candidates for on-farm trials. Once permission has been given by the executive committee, vegetative buds are micropropagated to provide root rot-free plants to growers. This is initiated by growing primocane from root harvested in late autumn from the SCRI field trial, vernalised and propagated as the root from the 'First stage selection'. Vegetative buds are initiated into micropropagation in the following spring to produce modules for field planting 12 months thereafter.

Pathogen-testing is initiated at this time to produce indexed mother stock in anticipation of commercialisation. This requires a minimum of one year, providing the plant material is at an appropriate growth stage. The mother plants must be free of all pathogens listed in the declaration, under E.P.P.O guidelines, to enter to certification scheme. Fully-tested mothers are held until a decision is made to release or discard these advanced selections.

The plants are distributed to growers within the Consortium and are trialled on diverse geographical sites and cultivation methods next to commercial cultivars for comparison. These trials are evaluated for at least two fruiting years. Growers are requested to fill out a single page 'Raspberry Trial Results Form', detailing plant establishment, cultivation and comparing the advanced selection with a control cultivar for various characteristics. The growers provide valuable feedback on how the selection performs on a commercial trial. If these advanced selections are superior to existing commercial cultivars, they will undergo commercialisation.

Results and discussion

2009 crossing programme

Last year 88 crosses were made at SCRI, targeting mainly resistance to *Phytophthora* root rot and improvement of primocane-fruiting types. Parent plants were identified as containing the resistance marker by Julie Graham's group at SCRI as part of the HORTlink project HL0169. Progeny from these crosses will be subsequently screened with this marker to identify seedlings with resistance to root rot with the intention of planting these populations in an infestation plot. DNA extraction was initiated in October 2010, the first results are expected by the end of 2010.

Breeding trials at SCRI

This year the following plots were under evaluation:

- 20 genotypes in a protected site of replicated 5-plant plots (plot J25), in its third and final season.
- 30 genotypes in a protected site of replicated 5-plant plots (plot J26), in its second season.
- 30 genotypes in a protected site of replicated 5-plant plots (plot J7), in its first season.
- Approximately 4000 seedlings from the 2007 crossing programme.

This season, three protected five-plant plots were evaluated under protected cropping. This year was the third and final season for the established plot J25, the second season of J26 and the first season for J7, planted in 2008/09.

- Cold spring temperatures led to late bud break and flowering of the early genotypes and the fruiting plots were covered earlier than scheduled in the first week of June. High temperatures in June brought on fruit development and the first genotypes started ripening in late June with the first pick on 5th July.
- Irrigation consultants, Agri-Tech, were used during the growing season to optimise irrigation applied in the tunnels.
- Yield and firmness were average but fruit size, flavour and brix levels were exceptionally good for most of the season.
- In the open field plot, all aspects of fruit quality, including flavour, Brix levels and fruit size were much poorer than in the protected plots.
- Efforts were made to cultivate the germplasm as close to a commercial system as possible. This proved a challenge as such diversity in a small area made uniformity

of spraying and feeding more difficult to achieve. The spraying programme is detailed in Table 5. *Phytophthora* root rot is now a significant problem in the protected 5-plant plot trials and was given a double dose of Shirlan. Monitoring pheromone traps for raspberry beetle (*Byturus tomentosus*) were used during flowering time but what appeared to be beetle damage was noted on the fruit in the second half of the season.

Table 8. SCRI protected cropping trials J25. J26 and J7 - spray programme 2010

Date	Product	Active	Application rate	Control
17/03/10	Osorno	Dichlobenil		Weeds
10/04/10	Shirlan	Fluazinam	1.5L/Ha	Root rot
25/05/10	Shark	Carfentrazone-ethyl	1.25L/Ha	Primocane
07/10/10	Shirlan	Fluazinam	1.5L/Ha	Root rot

The trial was hand-picked for yield and basic fruit quality characteristics were evaluated; size, shape, colour, firmness flavour and Brix were assessed once per week. In Appendix 1, yield and season data for each plot can be found in Tables 13, 14 and 15, selections are ranked in order of yield (highest to lowest) in Tables 16, 17 and 18. All arbitrary scores on fruit quality and plant habit are summarized alongside fruit size and Brix levels in Tables 20, 21 and 22. Shelf-life evaluations are found in Table 19 and are ranked in order from good to poor shelf-life.

Key selections from the plots, including selections currently in on-farm trials are summarized in Table 9, 10 and 11. Mean yield of the selections fruiting in the plots are shown in a bar graphs in Figures 5, 6 and 7.

Table 9. Plot J25 (third season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
9350F3*	6357.5	5.4	8.7	12/07/10	Mid-late season. Attractive, large conical fruit, excellent display, flavour sweet + mild this season, high yield
0304F6*	5171.9	5.2	11.8	12/07/10	Mid-late season. Large pale meaty fruit, strong sweet flavour with an acid edge, great display on long, strong laterals
99111B2*	4846.2	5.1	9.6	08/07/10	Early-mid season, dark fruit, slightly soft at end of season, very upright primocane, continues to display strong tolerance to *Phytophthora*,
Glen Fyne	4981.5	5.0	10.2	12/07/10	Mid season. Fruit is firm with good cohesion and has a sweet and aromatic flavour. Canes produce a high yield of good quality fruit
Tulameen	2495.5	5.1	11.8	12/07/10	Sweet, strong flavour but rough, lumpy and soft all season
Octavia	4596.8	5.4	9.9	16/07/10	Very late, Enormous fruit, pale, tearing collar, good aroma but sharp

*Selections currently identified for on-farm trials

Table 10. Plot J26 (second season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
0453C4*	4115.0	4.8	11.2	06/07/10	Very early. Glossy, firm, good shelf-life, great sweet + floral flavour all season, good habit + display, small at end of season
0453C5	3430.4	4.7	9.5	06/07/10	Early. Very attractive in a punnet, good flavour all season, very firm, great display.
0433F2*	3422.8	5.1	11.2	12/07/10	Glossy conical fruit – looks like Tulameen, sweet + aromatic.
0433H-3	5098.1	4.8	9.4	08/07/10	Early season. Sweet + floral flavour, consistent through the season, firm, slightly dull, smaller at end of season
9911C-1*	3649.8	6.1	10.1	08/07/10	Early season. Large fruit with prominent drupes, sweet + floral all season, solar damage early season
Glen Ample	3645.0	5.3	9.9	08/07/10	Very poor example of Ample. Short laterals and petioles, very difficult to pick, flavour acid for Ample
Glen Fyne	2971.7	5.4	11.6	12/07/10	Mid season, large fruit, sweet + juicy, good yield but root rot symptoms in plot
Octavia	4111.6	6.4	9.9	19/07/10	Late season. Fruit clustered on very short petioles, sharp but nice aroma, some mildew on primocane
Tulameen	3185.1	5.1	11.7	16/07/10	Variable establishment, 4/5 plants with very poor quality – rough + crumbly, bleeding in punnet, superb flavour

*Selections currently identified for on-farm trials

Table 11 . Plot J7 (first season): Summary of characteristics of key selections at SCRI

Genotype	Mean yield / stool (g)	Mean fruit size (g)	Mean Brix %	First pick date	Characteristics
0485K-1	3631.0	6.0	11.1	12/07/10	Mid-season. Large, conical + glossy fruit consistent quality all season. Popular with visitors. Easy + quick to pick. Has *Gene H*. A clear winner in 2010.
0485K-2	3123.6	5.4	10.3	12/07/10	Very bright shiny and long conic like sister K-1 better shelf-life but slightly less flavour. Has *Gene H*
00123A7*	2999.3	6.2	12.0	12/07/10	Very good quality and popular flavour in 2010. High brix levels all season
0019E2*	1862.5	6.8	10.1	19/07/10	Late season. Enormous fruit size. Top laterals breaking at node and collapsing
0534RB1	2714.9	6.9	12.3	16/06/10	Late season. Enormous fruit size – first pick >8g. Long laterals >1m, but not collapsing
04108F-5	3908.3	4.7	11.5	16/07/10	Shiny pale fruit is pretty in a punnet, excellent shelf-life, stays firm and bright after 7 days
0015F1	2874.5	5.4	10.5	16/07/10	Good display, long strong laterals, upright primocane makes fruit visible and easy to pick, good shelf-life
Glen Doll	2199.2	5.4	11.6	19/07/10	Firm and dry but sweet and fruity. Large fruit this season well displayed on long laterals
Glen Ample	2715.1	5.1	9.8	12/07/10	Flavour slightly acidic for Ample but typically easy to pick and manage
Tulameen	1757.3	5.5	11.7	19/07/10	Good flavour and quality in this plot, fruit a bit too soft

*Selections currently identified for on-farm trials

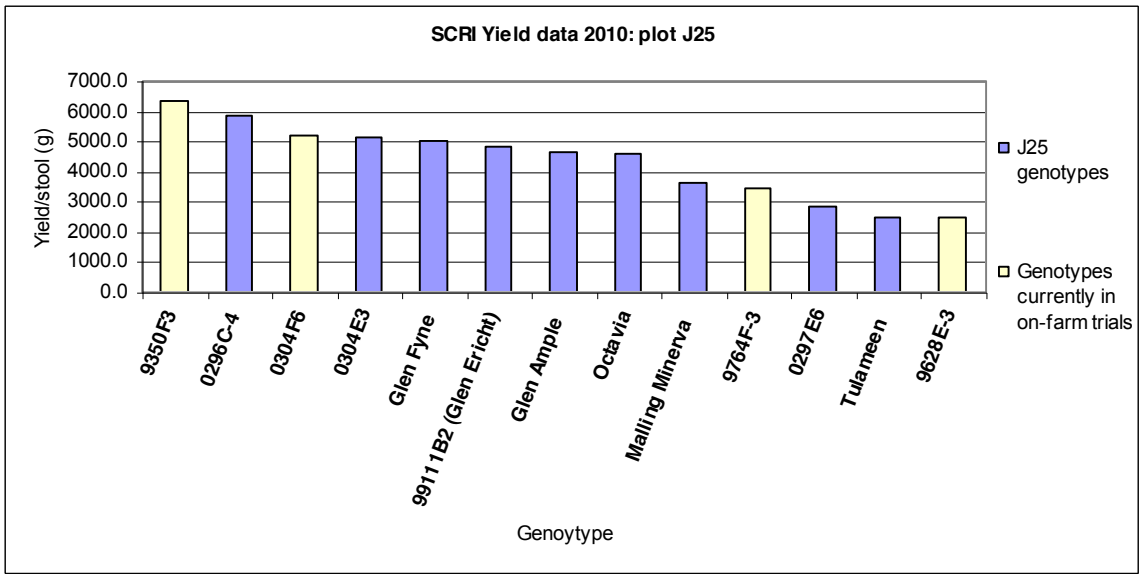

Figure 5. Mean yield of selections in SCRI plot J25

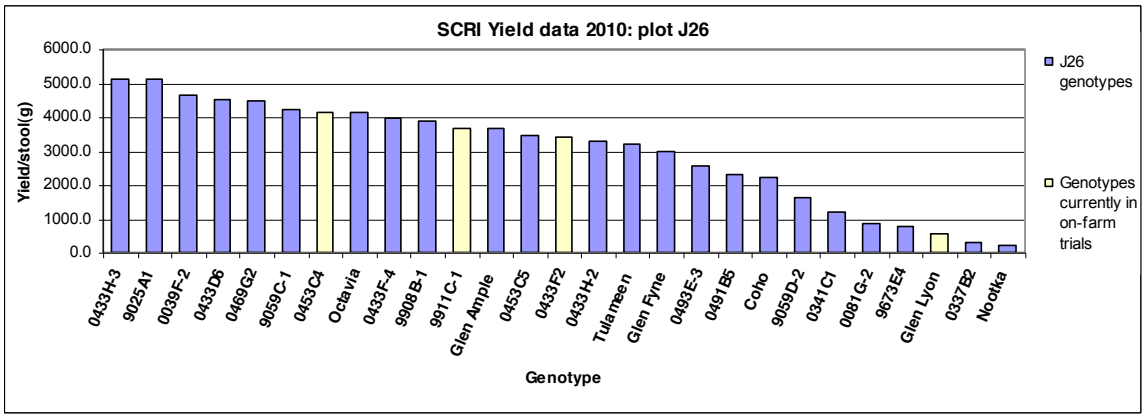

Figure 6. Mean yield of selections in SCRI plot J26

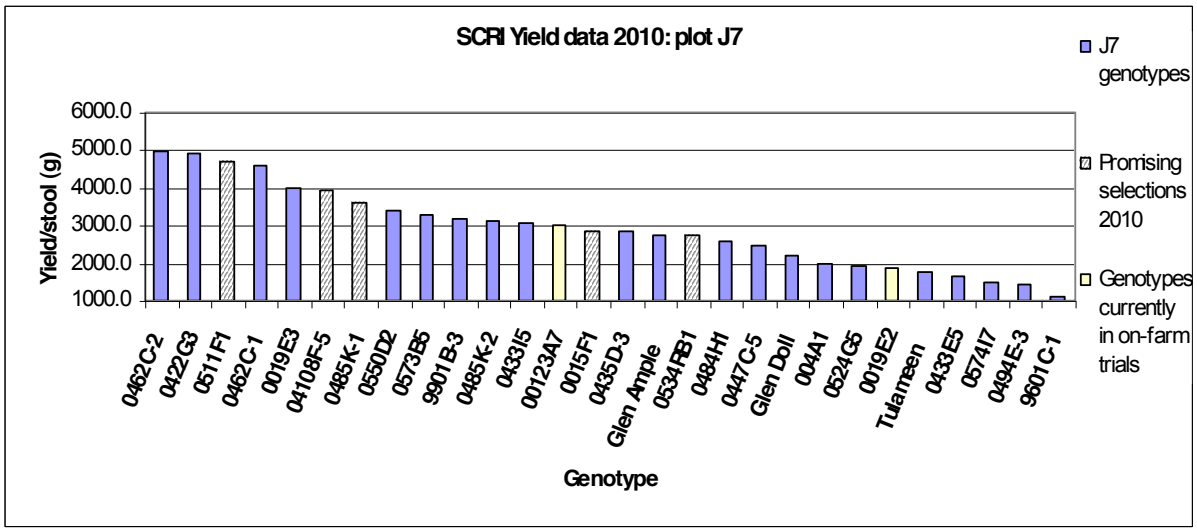

Figure 7. Mean yield of selections in SCRI plot J7

Elite selections identified in 2009

- **9350F3 (EM5961/1 x 26C1).** This productive mid-late season selection performed well in SCRI plots in 2008, 2009 and 2010 producing large fruit with a pleasant sweet flavour all season, and producing the highest yield in 2010. Results from this season can be found in Table 9, Figure 5, Table 12 and Appendix 1, Tables 13, 16 and 19.
- **0453C4 (0015D3 x 9059C-1).** This very early season selection started picking 5 days before Glen Lyon and performed well in SCRI plots in 2009, producing firm fruit with a good shelf-life and a sweet and floral flavour all season. Results from this season can be found in Tables 10 and 12, Figure 7 and Appendix 1, Tables 14, 17, 19 and 21.
- **0304F6 (9455F-2 x 9050RD3).** This mid season selection has performed well in SCRI trials in 2008, 2009 and 2010. It has large bright pale fruit presented well on long but strong laterals and is very productive. Results from this season can be found in Tables 9,and 12, Figure 6 and Appendix 1, Tables 13, 16 19 and 20.
- **0433F2 (003RB1 x 0015D3).** This mid-season selection strongly resembles Tulameen in appearance, with large conical glossy fruit and sweet aromatic flavour. There are concerns with the firmness of the fruit in SCRI plots in 2009 and 2019. Results from this season can be found in Tables 10 and 12, Figure 7 and Appendix 1, Tables 14, 17, 19 and 21.

Proposed new elite selections for on-farm trials

- **0485K-1 (0030E-12 x 0039F-2).** This mid season selection was fruiting for the first time in 5-plant plots in 2010 and was outstanding in SCRI plots with conical fruit with a high gloss.
- **0534RB1 (9764F-3 x Tulameen)**. This late season selection with enormous fruit size (up to 8g).

On-Farm Selections

Since 2002, several selections have been identified for on-farm trials. Location and distribution of these selections are shown in Appendix 1, Tables 23 and 24. Feedback forms were sent to triallists to assess yield and fruit quality relative to control varieties. The returned forms are summarized in Appendix 1, Table 26 and some of the selections are described below. The progress of disease-testing of each selection is indicated in Table 12.

<u>Selections identified in 2002/03</u>

Seven selections were planted out on-farm trials in 2005 (see Appendix 1, Tables 13, 16, 19 and 20) including two selections with good tolerance to root rot, 99111A1 and 99111B2, which are discussed below. The remaining selections, selected from outside plots at SCRI

between 2002 and 2003. Early feedback from these trials suggests that selection 9455F-2 is the most promising from this group in terms of fruit quality, flavour and yield.

Phytophthora tolerant selections 99111A1 and 99111B2

In 2006, plants were sent out to growers for on-farm trialling. One triallist, Pete Marshall, planted the selections, alongside Glen Moy control plants, into ground that was severely infested with *Phytophthora*, where a seven year old plot of Glen Ample had been seriously infected and grubbed out in 2003. This year, 99111B2 showed symptoms of root rot for the first time only after the root system was disturbed.

Established plots of both selections were fruiting at SCRI in protected and open field plots this season. Both are well suited to machine-harvesting and although yield and fruit quality are impressive, flavour remains to be poor relative to Glen Ample and Tulameen, and are therefore recommended for the processing market.

Selections identified in 2004 and 2005

Two selections 9764F-3 and 9628E-3, selected in 2004 were sent for micropropagation in 2005. Plants of 9764F-3 were sent to triallists in spring 2007. Plants of 9628E-3 were planted late 2008 and spring 2009. Both 9764F-3 and 9628E-3 have been fruiting in replicated protected plots for several years at SCRI and the data has shown a good consistent performance in terms of yield, fruit size and quality. For the second consecutive season, 9628E-3 produced the higher yield, larger mean fruit size and slightly higher mean Brix but had variable flavour throughout the season. Selection 9764F-3 had better eating quality and a more consistent flavour.

Selection 00123A7 was selected for trials in 2005, after one season of evaluation at SCRI, and fast-tracked through micropropagation and planted into on-farm trials in 2007 and 2008. Feedback from trials was mixed with a small fruit size as the main concern. This selection will be fruiting on more trial sites in 2010, including a new plot at SCRI.

Selections identified in 2006

In 2006, two new selections 9911C-1 and 0019E2 were selected for on-farm trials. 9911C-1 is an early season selection. 0019E2 is a mid to late season selection with large, firm conical fruit. Micropropagated plants were planted out on six trial sites in autumn 2008. Feedback indicates that the plants have established well, and early fruit results from 0019E2 are very promising. At SCRI 9911C-1 performed well during the last two seasons. 0019E2 will fruit in a new SCRI plot in 2010. Selection 9911C-1 was dropped from the list in 2010 at the UKRBC summer meeting.

Table 12. Selections undergoing disease testing at SCRI

Selection	Progress of pathogen testing	Indexed root available
Glen Doll	Fully tested. Material in high health house	2008 (6 mothers)
Glen Fyne	Fully tested. Material in high health house	2008 (6 mothers)
99111A1	Fully tested. Material in high health house	2008 (6 mothers)
99111B2	Fully tested. Material in high health house	2008 (6 mothers)
9628E-3	Fully tested. Material in high health house	2008 (6 mothers)
9764F-3	Fully tested. Material in high health house	2008 (6 mothers)
00123A7	Fully tested. Material in high health house	2008 (6 mothers)
9911C-1	Fully tested. Material in high health house	2009 (4 mothers)
0019E2	Fully tested. Material in high health house	2009 (4 mothers)
9350F3	Fully tested. Material in high health house	2010 (4 mothers)
0453C4	Fully tested. Material in high health house	2010 (4 mothers)
0433F2	Fully tested. Material in high health house	2010 (4 mothers)
0304F6	Fully tested. Material in high health house	2010 (4 mothers)
9025A1	Awaiting results	Expected 2011
9046RA2	Material from John Hamilton, positive for virus	Expected 2011

2011 Fruit Season

The following SCRI plots will be fruiting and evaluated in 2011:

- Protected plot of 20 SCRI selections identified in 2006.
- Protected plot of 30 SCRI selections identified in 2007.
- Protected plot of 20 SCRI selections identified in 2008.
- Protected plot of primocane-fruiting seedlings, crossed in 2009.
- Demonstration plot of SCRI *Rubus* cultivars.
- 4000 seedlings from crosses made in 2008.

Deployment of marker assisted selection in the breeding programme

Breeding for resistance to *Phytophthora* root rot is a major objective of the breeding programme. The traditional method of selection involves screening progeny in an infestation plot at SCRI, which is time-consuming and costly in terms of field resources.

The HORTlink project, HL0169, headed by Julie Graham at SCRI, has made it possible to shorten this process through the use of genetic markers linked to root rot resistance. These

markers were validated in 2008, and parental material with the marker was identified and used in the 2009 crossing programme. Approximately 3000 progeny from these crosses were germinated, spiney genotypes and those susceptible to the large raspberry aphid were discarded. The remaining seedlings, approximately 1000 individuals, will be screened to identify resistant individuals very early in the breeding process.

Marker assisted selection has become recently available to identify other important traits early in the selection process, namely fruit quality characteristics (HORTlink project HL0170). The decision to use fruit size as the next trait was made in 2010. These will be easily integrated with the markers for root rot resistance and seedlings will be screened routinely using these techniques.

Molecular breeding is not a replacement for conventional breeding, a good germplasm base is required, crossing will continue and field screening is still required. This new contemporary breeding approach integrates conventional breeding with molecular breeding and creates a valuable toolkit which will:

- Select important traits early in the breeding programme.
- Eliminate undesirable types before field planting.
- Reduce numbers, and therefore field costs, of early stage breeding material.
- Reduce the timescale to a commercial variety.
- Result in a more efficient, focussed breeding programme that will produce high quality cultivars suitable for low input production.

Use of the markers in the germplasm makes this an exciting time for raspberry breeding and puts the programme at the forefront of molecular breeding in perennial crops.

Conclusions

- Glen Fyne performed very well in SCRI trials producing a high yield of fruit with exceptional flavour. This has been consistent for the last two seasons. First plants became available from propagators in spring 2008.
- *Phytophthora* tolerant selections 99111A1 and 99111B2 are continuing to perform well in protected and open-field machine-harvested plots, both are productive with good fruit quality suitable for processing. Selection 99111A1 appears to be acutely susceptible to RBDV at SCRI, whilst 99111B2 remains RBDV-free. Propagation licenses are held by Trade Solutions and RW Walpole.
- Selection 00123A7 was planted on on-farm trials in six UK sites and produced a small crop in 2009. Plots are still to establish but early results are encouraging.

- Selections 0019E2 and 9911C-1 were planted on farm trials in 2008 and early trial data from one site was very promising.
- One new selection 9350F3 performed well in SCRI trials in 2008 and 2009 and is recommended for on-farm trials in 2010.
- Three new selections 0453C4, 0304F6 and 0433F2 stood out in SCRI plots with good eating quality and generated lots of interest from various visitors to SCRI during the fruit season and are recommended for on-farm trials in 2010.

Technology transfer

- A presentation of the project was given at the following events:
  - HDC/NSA Fruit Health Technical Seminar, Wyboston Lakes, 25th November 2009 (invited speaker).
  - SSCR Soft fruit meeting, 17th February 2010.

Attendance at the following event displaying posters and leaflets, promoting the breeding programme and cultivars:

- Fruit Logistica, Berlin, 3rd-5th February 2010.
- FPJ Fruit meeting, Perth, 23rd February 2010.

Publications

- Lye, G.C., Jennings, S.N., Osbourne, J.L. and Goulson, D. Impacts of the provision of non-native commercial *Bombus terrestris* (Hymenoptera: Apidae) colonies on yield and pollinator visitation of raspberry. Journal of Economic Entology. In press.
- 'Raspberry variety trials at SCRI in 2009' Horticultural Development Company Factsheet 22/08, Project SF35b

Other Knowledge Transfer

- Edinburgh University Plant Science students, 18th November 2009.
- Aberdeen breeding and biotechnology students, 8th December 2009.
- Strathclyde Food Science MSc students, 24th March 2010.
- HRH Princess Anne, 7th June 2010.
- HDC Trial Oxford, 3rd July 2010.
- On-farm trial visits, 27-29th June 2010.
- Belgian soft fruit growers, 9th July 2010.
- Bulgarian University Deans, 9th July 2010.
- SAC Horticulture students, 21st September 2010.

GLOSSARY

Cotyledon	The embryonic leaf of a seed.
Crossing	The mating of individuals of different genotypes of the same species in order to promote genetic recombination.
Emasculation	The removal of male reproductive organs.
Genotype	An individual with a unique genetic constitution.
Pistil	The female reproductive structure of a flower, consisting of ovary, style and stigma.
Progeny	The resulting offspring of a cross.
Seed scarification	The physical disruption of the seed episperm.
Seed stratification	The exposure of seeds to extended cold periods prior to germination at warm temperatures.
Stigma	The surface of a pistil upon which the pollen grains germinate.
Vernalisation	A process of thermal induction in plants, in which growth and flowering are promoted by exposure to low temperatures.

References

Graham, J., Smith, K., Tierney, I., MacKenzie, K., Hackett, C.A. 2006. Mapping gene *H* controlling cane pubescence in raspberry and its association with resistance to cane botrytis and spur blight, rust and cane spot. Theo. Appl. Gen. 112: 818-831.

Lincon, R.J., Boxshall, G.A., Clark, P.F.1982. A dictionary of ecology, evolution and systematics. Cambridge University Press.

APPENDIX 1

Table 13. SCRI Polytunnel site J25 – Yield and season data in 2009 (third fruiting year)

Selection	Rep	Bud break	First flower	First pick	Last pick	Yield / Stool (g)
Glen Fyne	1	22/03/10	01/06/10	08/07/10	09/08/10	4792.4
99111B2 (Glen Ericht)	1	19/03/10	01/06/10	08/07/10	05/08/10	5078.8
0296C-4	1	25/03/10	04/06/10	12/07/10	12/08/10	5852.6
9350F3	1	07/04/10	04/06/10	12/07/10	09/08/10	6357.5
0304E3	1	29/03/10	04/06/10	12/07/10	09/08/10	5113.0
Malling Minerva	1	19/03/10	01/06/10	12/07/10	09/08/10	3633.2
Glen Fyne	1	25/03/10	01/06/10	12/07/10	15/08/10	5170.6
0297E6	1	19/03/10	28/05/10	08/07/10	09/08/10	2842.4
Glen Ample	1	07/04/10	04/06/10	08/07/10	09/08/10	4502.3
9764F-3	1	19/03/10	04/06/10	12/07/10	09/08/10	3325.4
Octavia	1	29/03/10	04/06/10	16/07/10	15/08/10	4596.8
9628E-3	1	19/03/10	04/06/10	12/07/10	09/08/10	4491.5
0304F6	1	19/03/10	08/06/10	12/07/10	15/08/10	6216.0
Tulameen	1	25/03/10	04/06/10	12/07/10	09/08/10	2841.2
99111B2 (Glen Ericht)	1	19/03/10	28/05/10	08/07/10	09/08/10	4613.6
Glen Ample	1	07/04/10	04/06/10	08/07/10	09/08/10	4823.4
9764F-3	1	19/03/10	01/06/10	12/07/10	09/08/10	3500.0
0304F6	1	25/03/10	08/06/10	16/07/10	09/08/10	4127.8
Tulameen	2	19/03/10	01/06/10	12/07/10	09/08/10	2149.8
9628E-3	2	19/03/10	01/06/10	12/07/10		477.7

Table 14. SCRI Polytunnel site J26 – Yield and season data in 2009 (Second fruiting year)

Selection	Rep	Bud break	First flower	First pick	Last pick	Yield / Stool (g)
0469G2	1	19/03/10	01/06/10	08/07/10	02/08/10	4453.5
0453C4	1	19/03/10	28/05/10	06/07/10	02/08/10	4115.0
0433H-2	1	19/03/10	24/05/10	06/07/10	09/08/10	3256.0
0493E-3	1	19/03/10	04/06/10	08/07/10	05/08/10	2545.6
9911C-1	1	19/03/10	28/05/10	08/07/10	02/08/10	2602.5
0453C5	1	19/03/10	24/05/10	06/07/10	02/08/10	3615.3
0491B5	1	29/03/10	08/06/10	12/07/10		488.0
0433F-4	1	19/03/10	01/06/10	06/07/10	02/08/10	3793.8
Glen Ample	1	01/04/10	01/06/10	08/07/10	09/08/10	3120.6
9908B-1	1	19/03/10	01/06/10	08/07/10	09/08/10	3893.5
Glen Fyne	1	19/03/10	01/06/10	12/07/10	09/08/10	2971.7
Octavia	1	12/04/10	08/06/10			0.0
0433F2	1	19/03/10	04/06/10	12/07/10	09/08/10	4299.0
Tulameen	1	19/03/10	04/06/10	16/07/10	09/08/10	2074.4
0341C1	1	19/03/10	28/05/10	08/07/10	09/08/10	1189.4
0433D6	1	19/03/10	28/05/10	06/07/10	05/08/10	4751.5
0433H-3	1	22/03/10	01/06/10	08/07/10	09/08/10	4955.0
9059C-1	1	29/03/10	04/06/10	12/07/10	09/08/10	4150.0
0081G-2	1	19/03/10	24/05/10	06/07/10	09/08/10	836.2
9673E4	1	19/03/10	28/05/10	06/07/10	02/08/10	769.8
0039F-2	1	19/03/10	04/06/10	08/07/10	09/08/10	3806.8
Glen Ample	2	07/04/10	04/06/10	08/07/10	09/08/10	4169.4
9059D-2	2	19/03/10	28/05/10	08/07/10	09/08/10	1617.2
0433D6	2	19/03/10	24/05/10	06/07/10	09/08/10	4246.8
Tulameen	2	07/04/10	04/06/10	16/07/10	12/08/10	4295.8
9911C-1	2	19/03/10	01/06/10	08/07/10	05/08/10	4697.0
0491B5	2	07/04/10	04/06/10	12/07/10	15/08/10	4112.6
0341C1	2	19/03/10	28/05/10	08/07/10	02/08/10	1182.0
0433F-4	2	19/03/10	01/06/10	08/07/10	09/08/10	4087.8
0433H-3	2	19/03/10	24/05/10	06/07/10	09/08/10	5241.2
Octavia	2	01/04/10	08/06/10	19/07/10	15/08/10	4111.6
0433F2	2	19/03/10	08/06/10	16/07/10	12/08/10	2546.6
9025A1	2	19/03/10	04/06/10	12/07/10	12/08/10	5098.0
0469G2	2	22/03/10	24/05/10		02/08/10	120.0
0453C5	2	19/03/10	01/06/10	08/07/10	09/08/10	3245.5
9059C-1	2	19/03/10	28/05/10	08/07/10	09/08/10	4246.5
0039F-2	2	19/03/10	01/06/10	08/07/10	02/08/10	5469.7
Glen Lyon	2	25/03/10	04/06/10	12/07/10	02/08/10	548.0
Coho	2	29/03/10	04/06/10	12/07/10	09/08/10	2233.8
Nootka	2	19/03/10	04/06/10	12/07/10	02/08/10	219.3

Table 15. SCRI Polytunnel site J7 – Yield and season data in 2009 (first fruiting year)

Selection	Rep	Bud break	First flower	First pick	Last pick	Yield / Stool (g)
0574I7	1	18/03/10	01/06/10	08/07/10	12/08/10	298.8
Glen Ample	1	12/04/10	01/06/10	12/07/10	09/08/10	3024.6
0433E5	1	18/03/10	24/05/10	12/07/10	05/08/10	2113.0
0485K-1	1	29/03/10	01/06/10	12/07/10	09/08/10	4601.8
0019E3	1	12/04/10	01/06/10	12/07/10	09/08/10	4944.4
0485K-2	1	07/04/10	01/06/10	12/07/10	12/08/10	4125.2
0484H1	1	18/03/10	01/06/10	12/07/10	09/08/10	4806.6
0447C-5	1	18/03/10	04/06/10	19/07/10	12/08/10	2465.8
0435D-3	1	18/03/10	24/05/10	08/07/10	05/08/10	5252.4
9901B-3	1	29/03/10	08/06/10	12/07/10	09/08/10	4118.6
04108F-5	1	07/04/10	11/06/10	19/07/10	15/08/10	4586.6
0422G3	1	18/03/10	08/06/10	12/07/10	09/08/10	5968.0
0462C-1	1	12/04/10	08/06/10	12/07/10	15/08/10	5347.4
0524G5	1	18/03/10	24/05/10	08/07/10	09/08/10	3449.8
0462C-2	1	07/04/10	01/06/10	12/07/10	15/08/10	4988.2
0433I5	1	18/03/10	28/05/10	08/07/10	09/08/10	3581.2
9601C-1	1	18/03/10	01/06/10	08/07/10	02/08/10	1132.0
0573B5	1	07/04/10	08/06/10	12/07/10	02/08/10	1957.3
0015F1	1	12/04/10	08/06/10	16/07/10	05/08/10	1581.8
0494E-3	1	22/03/10	04/06/10	12/07/10	02/08/10	291.0
0534RB1	1	18/03/10	08/06/10	12/07/10	12/08/10	2525.3
Tulameen	1	22/03/10	11/06/10	19/07/10	09/08/10	1277.0
Glen Doll	1	29/03/10	04/06/10	19/07/10	05/08/10	1374.8
0019E2	1	12/04/10	11/06/10	19/07/10	05/08/10	1336.4
00123A7	1	18/03/10	01/06/10	12/07/10	05/08/10	2552.0
0573B5	1	07/04/10	08/06/10	12/07/10	12/08/10	4649.6
0015F1	2	12/04/10	11/06/10	16/07/10	12/08/10	4167.2
Glen Doll	2	29/03/10	01/06/10	16/07/10	12/08/10	3023.6
Tulameen	2	18/03/10	04/06/10	16/07/10	09/08/10	2237.6
0534RB1	2	18/03/10	08/06/10	19/07/10	12/08/10	2904.4
0494E-3	2	18/03/10	04/06/10	12/07/10	05/08/10	2564.0
9601C-1	2	18/03/10	01/06/10	08/07/10	02/08/10	1137.5
0550D2	2	25/03/10	04/06/10	12/07/10	09/08/10	3380.0
0433I5	2	18/03/10	28/05/10	08/07/10	09/08/10	2567.8
0484H1	2	18/03/10	01/06/10	08/07/10	02/08/10	336.5
0435D-3	2	18/03/10	24/05/10	08/07/10	02/08/10	406.0
9901B-3	2	22/03/10	01/06/10	12/07/10	12/08/10	2256.6
04108F-5	2	29/03/10	11/06/10	16/07/10	12/08/10	3230.0
0485K-2	2	29/03/10	04/06/10	08/07/10	09/08/10	2122.0
0019E3	2	12/04/10		12/07/10	09/08/10	2995.0
0485K-1	2	07/04/10	04/06/10	08/07/10	09/08/10	2660.2
0511F1	2	18/03/10	01/06/10	12/07/10	12/08/10	4630.4
0574I7	2	18/03/10	01/06/10	08/07/10	09/08/10	2725.0
0422G3	2	22/03/10	01/06/10	08/07/10	09/08/10	3821.3
0462C-1	2	07/04/10	04/06/10	12/07/10	09/08/10	3830.3
0524G5	2	18/03/10	01/06/10	12/07/10	02/08/10	439.3
004A1	2	25/03/10	01/06/10	08/07/10	02/08/10	1953.8
Glen Ample	2	07/04/10	04/06/10	12/07/10	09/08/10	2405.6
0433E5	2	18/03/10	24/05/10	08/07/10	02/08/10	1156.8
0019E2	2	12/04/10	11/06/10	12/07/10	09/08/10	2388.7
00123A7	2	18/03/10	28/05/10	08/07/10	05/08/10	3446.5

Table 16. SCRI Yield data 2010 J25, ranked mean yield/stool

Selection	Yield/Stool (g) Rep 1	Yield/Stool (g) Rep 2	Mean Yield/Stool (g)
9350F3	6357.5	*	6357.5
0296C-4	5852.6	*	5852.6
0304F6	6216.0	4127.8	5171.9
0304E3	5113.0	*	5113.0
Glen Fyne	5170.6	4792.4	4981.5
Glen Ericht (99111B2)	5078.8	4613.6	4846.2
Glen Ample	4823.4	4502.3	4662.9
Octavia	4596.8	0.0	4596.8
Malling Minerva	3633.2	*	3633.2
9764F-3	3325.4	3500.0	3412.7
0297E6	2842.4	*	2842.4
Tulameen	2841.2	2149.8	2495.5
9628E-3	4491.5	477.7	2484.6
Glen Cally (99111A1)	558.8	*	558.8

Table 17. SCRI Yield data 2010 J26, ranked mean yield/stool

Selection	Yield/stool (g) Rep 1	Yield/stool (g) Rep 2	Mean Yield/stool (g)
0433H-3	4955.0	5241.2	5098.1
9025A1	5098.0	*	5098.0
0039F-2	3806.8	5469.7	4638.2
0433D6	4751.5	4246.8	4499.2
0469G2	4453.5	120.0	4453.5
9059C-1	4150.0	4246.5	4198.3
0453C4	4115.0	*	4115.0
Octavia	*	4111.6	4111.6
0433F-4	3793.8	4087.8	3940.8
9908B-1	3893.5	*	3893.5
9911C-1	2602.5	4697.0	3649.8
Glen Ample	3120.6	4169.4	3645.0
0453C5	3615.3	3245.5	3430.4
0433F2	4299.0	2546.6	3422.8
0433H-2	3256.0	*	3256.0
Tulameen	2074.4	4295.8	3185.1
Glen Fyne	2971.7	*	2971.7
0493E-3	2545.6	*	2545.6
0491B5	488.0	4112.6	2300.3
Coho	2233.8	*	2233.8
9059D-2	1617.2	*	1617.2
0341C1	1189.4	1182.0	1185.7
0081G-2	836.2	*	836.2
9673E4	769.8	*	769.8
Glen Lyon	548.0	*	548.0
0337B2	*	291.8	291.8
Nootka	219.3	*	219.3

Table 18. SCRI Yield data 2010 J7, ranked mean yield/stool

Selection	Yield/stool (g) Rep 1	Yield/stool (g) Rep 2	Mean Yield/stool (g)
0462C-2	4988.2	*	4988.2
0422G3	5968.0	3821.3	4894.6
0511F1	4708.2	4630.4	4669.3
0462C-1	5347.4	3830.3	4588.8
0019E3	4944.4	2995.0	3969.7
04108F-5	4586.6	3230.0	3908.3
0485K-1	4601.8	2660.2	3631.0
0550D2	3380.0	*	3380.0
0573B5	1957.3	4649.6	3303.4
9901B-3	4118.6	2256.6	3187.6
0485K-2	4125.2	2122.0	3123.6
0433I5	3581.2	2567.8	3074.5
00123A7	2552.0	3446.5	2999.3
0015F1	1581.8	4167.2	2874.5
0435D-3	5252.4	406.0	2829.2
Glen Ample	3024.6	2405.6	2715.1
0534RB1	2525.3	2904.4	2714.9
0484H1	4806.6	336.5	2571.6
0447C-5	2465.8	*	2465.8
Glen Doll	1374.8	3023.6	2199.2
004A1	*	1953.8	1953.8
0524G5	3449.8	439.3	1944.5
0019E2	1336.4	2388.7	1862.5
Tulameen	1277.0	2237.6	1757.3
0433E5	2113.0	1156.8	1634.9
0574I7	298.8	2725.0	1511.9
0494E-3	291.0	2564.0	1427.5
9601C-1	1132.0	1137.5	1134.8

Table 19. Shelf-life scores: Evaluated 7 days after picking, stored at 4C. Ranked from best to worst

		Post harvest (PH) scores								
Selection	**Field Expt**	**PH Rank (1-54)**	**PH Bleeding**	**PH Brightness**	**PH Colour**	**PH Blotchy**	**PH Mould**	**PH Firm**	**PH SLE**	**Notes**
0039F-2	J26	1	1	7	3	1	1	6	9	Dry no bleeding
0462C-1	J7	2	1	8	5	1	1	7	9	Looks stunning, slight darkening, large fruit
04108F-5	J7	3	1	7	3	1	1	7	9	
0485K-2	J7	4	1	7	4	2	1	6	8	A few softening drupes
9059C-1	J26	5	1	6	5	2	1	6	8	
9901B-3	J7	6	1	5	4	1	1	7	8	Slightly rough drupes
0304F6	J25	7	1	6	4	1	1	7	8	
0296C-4	J25	8	1	6	4	2	1	7	8	
0297E6	J25	9	1	6	5	2	1	7	8	
Octavia	J25	10	1	7	5	2	1	7	8	
0462C-2	J7	11	1	6	5	2	1	6	8	
0015F1	J7	12	1	6	4	2	1	6	8	
0422G3	J7	13	1	5	4	2	1	6	8	
0524G5	J7	14	1	6	5	2	1	6	8	
9673E4	J26	15	1	8	5	2	1	6	8	Too small
9350F3	J25	16	1	5	4	2	1	6	8	
0485K-1	J7	17	1	6	5	2	1	6	8	
0447C-5	J7	18	1	6	5	2	1	6	7	
0493E-3	J26	19	1	5	5	1	1	6	7	
0453C5	J26	20	1	6	5	3	1	6	7	
0433I5	J7	21	1	6	5	2	1	6	7	
0433F2	J26	22	1	6	5	3	1	5	6	Still looks like Tulameen!
0574I7	J7	23	1	7	6	3	1	6	6	
0304E3	J25	24	1	5	4	3	1	6	6	Pale but blotchy, individual drupes softening
0484H1	J7	25	1	6	6	2	1	6	6	
0433F-4	J26	26	1	4	4	3	1	6	6	Varied shape
Glen Doll	J7	27	1	5	5	2	1	6	6	
Glen Fyne	J25	28	1	6	6	3	1	5	6	Slightly rough

		Post harvest (PH) scores								
Selection	**Field Expt**	**PH Rank (1-54)**	**PH Bleeding**	**PH Brightness**	**PH Colour**	**PH Blotchy**	**PH Mould**	**PH Firm**	**PH SLE**	**Notes**
9628E-3	J25	29	1	5	4	4	1	6	5	
Tulameen	J25	30	1	7	6	4	1	5	5	
0019E3	J7	31	1	6	6	3	1	6	5	
Tulameen	J26	32	1	7	6	4	1	5	5	
9764F-3	J25	33	1	5	6	3	1	6	5	
0019E2	J7	34	1	6	5	5	1	7	5	
0433H-2	J26	35	1	5	5	3	1	7	5	
0433E5	J7	36	1	5	5	4	1	6	5	
0453C4	J26	37	1	6	5	4	1	6	5	
Tulameen	J7	38	1	7	6	4	1	5	5	
0534RB1	J7	39	1	6	6	5	1	6	5	
0435D-3	J7	40	1	4	4	4	1	5	5	
0015F1	J7	41	1	5	5	5	1	6	5	
9908B-1	J26	42	1	6	7	2	1	5	5	
0433D6	J26	43	1	4	5	6	1	5	5	
0433H-3	J26	44	1	4	6	4	1	6	5	
Glen Fyne	J26	45	1	6	6	3	1			
Glen Fyne	J25	47	1	6	6	3	1	5	5	
Glen Ample	J26	48	1	6	6	4	1	6	5	
Glen Fyne	J25	49	1	6	6	3	2	5	5	Very sweet + floral, juicy,
0469G2	J26	50	1	5	4	6	1	4	4	
99111B2	J25	51	1	4	7	4	1	4	4	
Malling Minerva	J25	52	1	2	7	3	1	5	4	Nice shape but dull bloom
0511F1	J7	53	1	5	5	3	4	6	3	Most have raspberry beetle damage
9062E-1	J25	54	1	6	7	3	2	4	3	

Table 20. SCRI Polytunnel site J25. Summary of arbitrary scores and comments (ranked highest to lowest)

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit Brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0304F6	1	5.4	11.9	9	5.7	5.3	3	7	7	6.7	6	6	x	Good shelf-life: stays firm + uniform after 10 days, productive, quick to pick, pale, attractive, good flavour with a good sweet/acid balance
0304F6	2	5.0	11.7	9	5.6	5	3	7	6.6	6.6	6	6	x	Pale, uniform, sweet + fruity with acid edge, consistent size + brix
9350F3	1	4.8	10.3	8.7	7	5.3	4.7	6	7	6.7	5	5.7		Attractive, neat and conical, firm and dry, strong laterals displays fruit well, good shelf-life
Glen Fyne	1	5.0	10.1	8	5.5	5.5	6		6.5	5.5	7	5		Some crumbly fruit late in season, sweet + fruity, slightly dark, beetle damage in August
0296C-4	1	5.4	10.8	9	6.7	5.3	4	7	6.7	6	4.7	5		Some beetle damage, strong laterals, good yield, good shelf-life: uniform
9062E-1	1	5.2	10.2	8.7	5.7	5.7	5	7	6.3	6	6	5		Sweet with a good raspberry flavour all season, large drupes ~Ample
0297E6	1	5.4	9.8	9	7	5.8	4.5	7	6.8	6.5	4.5	5		Flavour mild + floral - nothing special, uneven ripening on late fruit, good shelf-life- bright + firm after 10 days,
9764F-3	1	9.7	5.4	8.7	6.7	6	4.7	7	7	6.7	5	5		Firm, attractive, large, sweet but meaty + little juice,
9451D4	2			8	5	4	5	7	7	7	5	5	x	Pleasant flavour -mild, good vigour, plant 3 struggling

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit Brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
Glen Fyne	1	4.9	9.5	7.8	5.5	5.8	5.3	7	5.8	5.5	6.8	4.8		Sweet, floral + juicy, check for RBDV
0304E3	1	6.4	9.5	9	5.7	5.7	3	6	6.7	6.3	4.3	4.7		Pale and bright, meaty in mouth, bit acid, slightly blotchy especially late fruit
9764F-3	2	5.6	10.4	8	6.6	5	5	6	6	6	4.6	4.6		Little juice but sweet, variable shape late in season, consistent size, easy to pick
Glen Fyne	1	5.0	11.0	7.7	5.3	6	5	7	6	5.7	6	4.5		Good raspberry flavour all season, some crumbly fruit in august
Octavia	1	5.4	9.9	8.5	5.5	5	4.5	6	6	7	4	4.5		Healthy plots cropping well with large fruit, variable flavour, good shelf-life, plots with root rot die off quickly
Tulameen	1	5.2	11.8	7.5	7	6.5	5	5	6.5	5	6	4.5		Excellent flavour, crumbly/murly in this plot, slightly soft
9628E-3	1	6.5	10.6	9	5.7	5.3	4	5	6	6.7	4.7	4.3		Bright pink-red, meaty, good vigour, hairy, uniform
Malling Minerva	1	4.5	10.8	9	7	5	5.5	6	7	5.5	4.5	4	x	Dull + too dark, pretty shape, sweet but 'woody'
99111A1 (Glen Cally)	2			7.5	6	4	5.5	8	7	5.5	3	4		Strong RBDV leaf symptoms but no RR symptoms, remove plot
Tulameen	2	5.2	12.0	7.6	6.6	6	5.6	6	5.6	4.6	6.3	4		Variable fruit set, plant 5 dead, bleeds in punnet, fabulous flavour
99111B2 (Glen Ericht)	1	4.8	9.1	9	5.7	4	6.3	8	7	6	3.3	3.7		Great plant habit + display, a 'hedge', too dark and acid for fresh market, easy + fast to pick

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit Brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
99111B2 (Glen Ericht)	2	5.3	10.0	8.6	6	4	6.3	8	7	6	2.6	3.6		Consistent fruit size, v. acid throughout season, healthy plants, good hedgerow, slightly dull + blotchy at end of season
9025A1	1							8		8	1		x	Processing and outside only
Glen Fyne	2													4/5 dead - root rot
0297E6	2													2 dead, remainder dying
0081G-2	2													3 dead, 2 dying
Malling Minerva	2													4 dead, 1 dying
0304E3	2													Dead
Octavia	2													4 dead, plant 1 ok so far
9350F3	2	6.0	7.0											4 dead plant 5 dying
9679RF2	2													Healthy, no symptoms
9628E-3	2	5.5	9.4											2 dead, 3 struggling
0296C-4	2													4 dead, 1 dying

Table 21. SCRI Polytunnel site J26. Summary of arbitrary scores and comments (ranked highest to lowest)

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0453C4	1	4.8	11.2	9	5	6.7	4.5	7	7	6	5.6	6		Early + short season, stunning, round, very sweet and creamy, too small?
0039F-2	2	4.0	9.2	9	6	6.6	2	7	7.6	5.6	5	6	x	Plant 5 dead, shame - good primocane growth (but poor habit), fabulous fruit, very attractive, juicy
9673E4	1	3.6	11.5	9	4.7	8.2	4.7	7	7.7	6.7	4.5	5.5	x	Very shiny "designer berries",stunning, sweet but mild, too small? Parent only
Tulameen	2	5.1	11.9	8.5	6.5	6.5	5	6	7	6	5	5.5		Best Tulameen sample but flavour not as good
Coho	1	4.5	11.3	9	7	5.5	4	5	7.5	6	6	5.5		Good colour, attractive, like 00123A7, plant 2 root rot
Glen Doll	1	5.3	10.3	9	6	4	5	6	7	6	6	5.3		Nice flavour and aromatic, long laterals drooping but ok
0433F2	1	4.5	11.7	9	6.3	6	4.6	6	7	4.3	6.6	5.3		Looks like good quality Tulameen, bright with superb flavour but too soft? Better shelf-life than Tulameen
Glen Fyne	1	5.4	11.6	9	5	6	5		7	5	7	5.2		1,4 and 5 dead, fruit attractive with good flavour on surviving plants
0039F-2	1	4.8	9.9	9	6	6.7	2.2	6	8	6	4.5	5.2	x	Orange, very bright, pretty, small, tall primocane toppling over, best shelf-life, firm, pale + uniform after 7 days

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0433F-4	2	4.4	9.7	9	5.7	5	4	6	7.5	5.7	5.5	5.2	x	Nice flavour, slightly blotchy, floral and fruity
0433H-3	2	4.6	9.5	9	6	5.2	4.2	6	7.8	7	5.2	5.2	x	Good vigour, sweet+ spicy flavour, slightly dull in a punnet, long season, good lateral display
0433F2	2	5.7	10.7	8.3	6.3	6	5.3	6	6	5	5.6	5		Lovely flavour, sweet and juicy, like a meaty Tulameen, borderline too soft
0433F-4	1	4.0	9.7	8.7	6.2	5	3.7	6	7.2	6	4.7	4.7	x	Pale, slightly blotchy, variable flavour, dull, + small at end
0433H-3	1	4.9	9.2	8.7	5.5	4.5	5	7	6.7	7	5.2	4.7	x	Early + long season but small at end, easy to pick, juicy + pleasant flavour
0433D6	1	4.8	10.6	8.8	6.8	4.2	5	6	7.4	6.8	4.8	4.6	x	Early, meaty texture, attractive in punnet, sweet, nothing special, beetle damage
0453C5	1	4.5	8.4	9	5	5.5	5	7	8	5.5	5	4.5		Early, v. short season, sweet and floral, attractive, neat, but variable
Glen Ample	2	5.4	9.5	8	5	5	5	5	6	5.7	4.7	4.5		Like 9911C-1, rough prominent drupes, untidy laterals, poor flavour for Ample
0491B5	2	5.5	10.0	8.5	4.5	6	5	5	6	7	4.5	4.5		Slightly uneven ripening, sweet but mealy
Octavia	2	6.4	9.9	8.5	5	4	4	6	5.5	7.5	4	4.5		Healthy plot, large very meaty, sharp but not bad flavour, still large and v firm at end of season
0433H-2	1	4.0	10.1	9	6	4.6	4.4	5	7.4	6.2	4.6	4.4	x	Early, conical neat drupes, sweet, size reduces quickly, too small

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
														by end of season
Glen Ample	1	5.2	10.3	8	5.6	6.3	5.3	6	6.3	5	4.6	4.3		Tearing collar, poor + slightly acid for Ample, poor shelf-life
9059C-1	1	5.7	10.9	9	5	5	4	6	7.3	5.6	5.6	4.3	x	Aromatic but sharp, slightly blotchy but good shelf-life, good parent
0453C5	2	4.9	10.6	8.6	5	6.3	4.3	6	7	6.6	4.6	4.3		Variable size and shape, mostly small, bright and attractive, aromatic, RLBM?
9908B-1	1	5.0	10.0	8.3	5.3	5.6	5.3	4	6.3	6	4.3	4		Plants 3 and 5 struggling, very attractive fruit, sweet, little juice, bright and uniform
Tulameen	1	5.2	11.4	8	7	6.3	5	6	5.6	4	6	4		Mixed crumbly + nice set, plant 2 ok,raspberry leaf and bud mite? Sweet and juicy but rubber aftertaste
0081G-2	1	5.0	8.9	9	4	7	5		7	7	4	4		Attractive, round, v firm, creamy, poor cane vigour, good parent only
9911C-1	2	6.1	10.2	9	5.5	5	5	5	5.5	5.5	6.5	4		Slighly murly, very sweet, aromatic, seedy, bleeding, laterals too long
9059C-1	2	5.3	10.5	8.3	5	5.3	3.3	6	6.6	4.6	4.3	4	x	Plant 4 dead, remaining OK, variable shape, juicy + tart
Nootka	1	3.5	14.4	9	4	4	7	5	4	3	6	4	x	3 healthy plants, dark, rough, soft, juicy and floral
9911C-1	1	6.2	9.9	8.3	5	5	5	6.3	6	5.6	3.6	3.8		Sweet + juicy, large fruit, slightly lumpy all season, long laterals need lifted when picking

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0493E-3	1	4.3	9.1	9	4.3	4	4.5	6	7	6.3	4.5	3.7		White collar, slightly dull but neat and uniform, no flavour, too small?
0433D6	2	4.4	11.4	9	6.5	4	5.5	7	7.2	6.5	4.7	3.7	x	Too dark, dull, unattractive, sweet + juicy, nothing special
0341C1	1	3.6	9.3	9	5.5	5	5.5	7	9	4.5	4.5	3.5	x	High, number of very small fruit, pretty but too small, very variable flavour
9059D-2	2	6.0	9.3	6	6	5	3		7	7	3	3		Plant 1 crumbly, soft, remove plot
9025A1	2	4.3	8.7	9	5	5	6	8	7.3	5.3	2	3	x	Healthy plot, good vigour, no root rot symptoms in badly infested row, flavour grassy - like eating peas
0469G2	2	4.7	8.3	9	4	7	5		7	4	3	3		Collapsing laterals, plants 1 and 2 dead, varied shapes, no flavour
0469G2	1	4.9	7.6	7.6	6.3	5	3.6	6	6	6	4.3	2		Blotchy, raspberry beetle damage, sunscorch, variable shape, unattractive
0491B5	1	4.4	7.3	9	5	6	6		8	5	2	2		Dark and glossy, grassy flavour, laterals breaking, small
9059D-2	1													All crumbly - remove plot
Octavia	1													Dead
9025A1	1													Collapsing laterals, no pick

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0491G1	1						7			3				Ppoor, soft and dark
0337B2	1	5.4	9.6											
Malling Leo	2												x	Wine flavour, collapsing primocane
0491G1	2													No symptoms
9062E-1	2													4 dead, 1 dying
0453C4	2													4 dead, 1 dying
Brice	2													Good primocane vigour, no root rot symptoms
0493E-3	2													Dead
9908B-1	2													Dead
9053B6	2													Dead - no establishment?
0433H-2	2												x	Dead
0015B3	2													Good primocane growth, floricane cut back
6396/46	2													1 "healthy "plant, 4 dead/dying
Glen Lyon	2	4.0	8.1											3 plants struggling, 2 dead

Table 22. SCRI Polytunnel site J7. Summary of arbitrary scores and comments (ranked highest to lowest)

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
00123A7	1	6.7	12.2	8.3	7	5.6	4.3	7	7	6.6	6.6	7.3		Blue-ish oval leaves, distinctive upright primocane, sweet coconut flavour - best in plot, good vigour
0485K-1	2	5.9	10.7	9	7.3	7.3	4.3	7	7.6	6.6	5.6	7.3	x	Large size all season - and stunning, healthy plant, winner for 2010, sweet
0485K-1	1	6.1	11.4	9	7.7	7.7	4	7	8.2	6	4.7	7	x	Fruit large and glossy - stunning, good vigour, long laterals - but strong, very easy to pick, well presented fruit, shelf-life good
0485K-2	1	5.3	9.7	9	7.7	7.2	4.5	6.5	8	6.5	5.5	6.7	x	Very similar to K-1, slight pear-drop, glossy, stunning, large, better shelf-life than K-1
0485K-2	2	5.5	10.9	9	7.5	7.2	4.5	6	8	6	5.7	6.7	x	Very bright, shiny, long-conic, good flavour, very sweet, beautiful all season
Glen Doll	2	5.6	12.3	9	5	5	5	7	6.5	7	7	6.5	x	Large fruit for Doll, good flavour, slight bubblegum, slight raspberry beetle damage, long strong laterals
04108F-5	2	4.6	11.5	9	5.6	7	3	8	8	7	4.6	6.3		Very bright, orangey - colour, very attractive, luminous, uniform, long laterals - ok
0534RB1	1	7.2	12.5	8.5	6.2	5.7	4.7	5	6.7	6.2	5.7	6		Giant laterals but very strong, huge fruit >8g 1st pick, sweet and fruity

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0534RB1	2	6.7	12.2	8.5	7.5	6	4	5	6.5	6	5.5	6		Late season, very very long laterals but strong, >1metre long, good flavour - slightly dry, huge fruit - didn't drop <6g, plant 1 struggling
04108F-5	1	4.8	11.4	9	5.6	7	3.3	7	6.6	7.3	4.3	5.6		Long strong laterals, shiny fruit, pretty, raspberry beetle damage around collar late season, excellent shelf-life - v firm + bright
Glen Doll	1	5.2	10.8	8.6	5.3	5	5	7	7	6.3	6.3	5.6	x	Prominent drupes, firm, meaty, dry but sweet and fruity
0015F1	2	5.2	10.7	9	6	5.6	5	6	6.6	6.6	5.3	5.6		Good display, long laterals but strong, upright primocane, easy pick and visible, sweet and floral, good shelf-life
0019E2	1	7.4	10.4	9	7	6	5	6	7	6.3	4.3	5.3		Many laterals collapsing, meaty monster fruit, watery flavour, better quality than E3
Tulameen	2	5.0	11.2	8	7	6.3	5	5	6	4.6	6.3	5.3		Nice-looking Tulameen, sweet and floral, long laterals -strong enough, floricane chlorotic, collar tearing early season, too soft
0433I5	2	4.3	11.1	8.6	5.6	5.6	4.3	6	7.3	6.3	5.6	5.3	x	Good display, plant 1 - root rot? Variable primocane growth, sweet, floral, meaty texture
0433I5	1	4.3	10.2	8.8	6.2	5.6	4.6	6.5	7.2	6.6	5.4	5		Long laterals - strong, small floricane leaves, some rough fruit, sweet but variable flavour, too small?

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0462C-2	2			9	5	6	5	6	7	6	6	5	x	Few floricane, pick next year
0574I7	2	4.6	9.2	8.6	8	5.6	5.3	6	6.6	6	5.3	5		Very very chlorotic floricane, small, dark, conic fruit, neat; sweet but no juice
0462C-1	2	5.9	9.7	9	5.5	7	4	6	7.5	6	5	5	x	Upright primocane, collapsing laterals, very attractive fruit, pleasant flavour, lovely in a punnet
0019E2	2	6.1	9.9	8	6.5	5.5	5	5	6	6	5	5		Huge fruit, some laterals collapsing, meaty
0435D-3	1	4.8	9.8	9	7.7	5.7	4	3	8	5.7	4.2	4.7	x	Early, pretty - looks like Juno, excellent display, mild, laterals well displayed- not too long, but v poor pick
9901B-3	1	5.0	11.3	8.7	5.2	4.7	3.5	5.5	6.5	7	4.2	4.7		Great colour but slightly rough, pleasant flavour, chewy texture, a few laterals collapsing, good shelf-life
Tulameen	1	5.9	12.2	8.3	7	6.6	5	6	7.6	4.3	6	4.6		Nice quality Tulameen, slight raspberry beetle damage, sweet and juicy
0019E3	1	5.0	10.3	9	6.5	6	5.2	6	7.2	6	4	4.5		Slightly blotchy, little flavour, long laterals drooping but ok, good yield but E2 better quality
0447C-5	1	7.0	11.1	8	6.5	5.5	5	4	6.5	5.5	6	4.5		Late season, v large 1st pick >8g, meaty, slightly rough, good flavour, sweet and fruity, top laterals collapsing, good shelf-life - stays firm + uniform

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0462C-1	1	5.5	8.6	9	5.6	7.3	3.6	6	7.3	6.3	4.3	4.5		Looks stunning, sweet + pleasant flavour, large fruit, excellent shelf-life, however, many broken laterals
0524G5	1	4.8	10.0	8	5.2	6	4.5	6	6.2	6.5	4	4.5		Slightly rough looking, firm and dry, poor flavour for first half of season, few floricanes
0462C-2	1	5.6	10.5	9	5.6	6.3	4.3	6	6.3	6	5	4.5	x	Laterals collapsing, very pretty round fruit, variable flavour - mostly sweet, good shelf-life
00123A7	2	5.7	11.8	8.5	7	5	4	6	7	6	6.5	4.5		Plant 1 - root rot? Still establishing, great flavour, slightly blotchy
0511F1	1	4.8	10.0	8.3	5.6	5	4	5.5	7.3	6.3	4.3	4.3		Pale, variable flavour, upright primocane, plant 5 crumbly, most have raspberry beetle damage
0422G3	1	4.6	9.1	9	7.6	5.6	3.6	6	7.3	7.3	3	4.3		Very firm, dry, very bright colour, pretty conical chape but little flavour all season, beetle damage at end
0550D2	2	4.6	10.3	9	6.3	5.6	5.6	5	6.3	6	4.3	4.3	x	Only 3 plants this year, sweet but mild, slight raspberry beetle damage
0422G3	2	4.9	9.5	9	7.3	5.6	4	6	7	6.6	4.6	4.3		Pale and conic, sweet but no juice, like pale 0574I7
0574I7	1	5.1	11.2	8.2	7	5.4	5.2	5	7.2	5.8	4.2	4.2		Patchy budbreak sweet but mild - chocolate flavour, like blotchy Tulameen

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
0433E5	1	4.9	10.7	8.7	5.2	4.5	4.7	6	7.2	5.2	6	4.2	x	Like Doll, slightly blotchy, sweet, good flavour, small, primocane in way of picking late in season, RLBM?, beetle damage at end of season
0484H1	1	5.5	9.6	9	5.6	5	5	5.5	7.6	6.3	4.3	4	x	Floricane chlorotic, raspberry leaf and bud mite? Very uneven ripening 2nd half of season - tartan berries, good display
0015F1	1	5.5	10.2	9	5.6	5	5	5	7.3	6	4.6	4		Slightly blotchy with pointy drupes - like Ample, sweet and floral
0573B5	2	4.4	10.6	8.6	4.6	6	5	8	6	6.3	4.3	4	x	Variable size, varied drupes, acid, bubblegum flavour
0447C-5	2			9	6	5	5	5	6	6	6	4		Fragile laterals, late fruit, large and meaty, sweet, too dry in mouth
9901B-3	2	4.8	8.4	8.6	5	4.6	3.3	7	6.6	7.3	4.3	4		Primocane obstructing pick, pale, slightly rough,early fruit poor flavour, lovely colour
0019E3	2	4.4	9.9	9	6	5.5	5.5	4	5	6	5	4		Slightly blotchy, slight tearing when picking
0511F1	2	5.5	10.7	8.6	6	5.3	5	4	6.6	6.6	4	4		Slightly rough looking, spicy flavour, dry and meaty, looks a bit like Ample
0524G5	2	5.1	10.7	9	6	5	5	7	7	5	4	4		Small, hairy, poor primocane growth, short laterals, good display

Selection	Rep	Mean Berry wt (g)	Mean Brix %	Fruit set	Fruit shape	Fruit brightness	Fruit colour	Pick	Collar	Firm	Flavour	Overall score	*Gene H* present	Notes
04101C3	2			8	5	5	5	7	7	5	6	4	x	Like Ample, juicy and floral, pick next year? Poor budbreak
0433E5	2	3.9	8.5	8.7	5.2	3.7	4.2	7	7	5.7	5.5	4	x	Compact plant, sweet and juicy, dull, white collar (unattractive in punnet)
004A1	2	4.8	9.5	7	4	5	5.5	6	5.5	4.5	5	3.5	x	Round, rough fruit, first fruit small, sweet and spicy, remove plot?
0494E-3	2	6.2	10.5	8.3	6	6	5.6	3	5.3	5.3	5.3	3.3		Plant 2 and 4 struggling - root rot? rough fruit, good flavour, poor pick - petioles stay attached
0494E-3	1	7.5	9.0	7	6	4	6	5	6	4	6	3		Variable fruit - rough, good flavour
0484H1	2	3.3	7.3	8	4	6	5		7	7	3	3	x	Small, dark and dull, acid + slightly bitter, remove plot
0573B5	1	4.8	12.0	8.5	5	5	5	6	5.5	4.5	4	2.6	x	Bad raspberry beetle damage, finish picking early, variable shape, slight crumble
9601C-1	1	4.3	8.7	9	5	4	7		7	7	2	2		Good lateral display, too dull and dark, remove plot
9601C-1	2	3.5	8.2	8	6	4.5	7		6	7	2	2		Too dark, blotchy, unattractive, poor flavour, (cardboard), remove plot
0435D-3	2	5.2	7.7											Small plants, <80cm

Table 23. Distribution of on-farm trial plants 2005/06

Customer	Triallist	Trialling & Testing	9612F2	99111B2	9455F-2	9451D4	9751E-2	99111A1	00123A7	Delivery
Hargreaves	Jane Fairlie, Hargreaves Plants Ltd, Cowpers Gate, Long Sutton, PE12 9BS	243.05	25	25	25					June 2005
		250			12	50	50	50		Autumn 2005
KG	Peter Bevan, KG Fruits Ltd, Tatlingbury Oast, Five Oak Green, Tonbridge, Kent, TN12 6RG	244.05	15	15	15					June 2005
		251				50	50	50		Autumn 2005
Berryworld	Paul Harold, Sunclose Farm, Butt Lane, Milton, Cambridge, CB4 6DQ	245.05	20	20	20					June 2005
	Peter Vinson, E Vinson Ltd, Ewell Farm, Graveney Road, Faversham, Kent, ME13 8UP	246.05	20	20	20					June 2005
		255				20	20			Autumn 2005
	Harry Hall, Hall Hunter Partnership, Heathlands Farm, Honey Hill, Wokingham, Berks	252				30	30			Autumn 2005
Trade Solutions	Peter Marshall, Peter Marshall & Co, Muirton of Alyth, Alyth, PH11 8JF	247.05	12	110	25					June 2005
	Michael Thomson, East Gormack, Blairgowrie, PH12 8UL	253		150		50	50	150		Autumn 2005
Summerfruit Company	Charles Atkins, Amery Court Farm, Chapel Lane, Blean, Canterbury,	249			38	50	50			Autumn 2005
ASF	Lochy Porter, Angus Soft Fruit Ltd, East Seaton, Arbroath, DD11 5SD	254			38	50	50	50		Autumn 2005
		278.06							38	May 2006

*Dropped from on-farm trials November 2005

Table 24. Distribution of on-farm trial plants 2007

Customer	Triallist	00123A7	9764F-3	0019E2	9911C-1	9628E-3	97134B1	0485K-1	Delivery
Hargreaves	Jane Fairlie, Hargreaves Plants Ltd, Cowpers Gate, Long Sutton, PE12 9BS	150	50						Spring 2007
				100	65	100			Autumn 2008
KG	Jon Regan, Hugh Lowe Farms Ltd, Europa Nurseries, Ashes Lane, Hadlow, Kent TN11 9QU	150	50						Spring 2007
BerryWorld	Peter Vinson, E Vinson Ltd, Ewell Farm, Graveney Road, Faversham, Kent, ME13 8UP		10	20		20			Spring 2007
	Harry Hall, Hall Hunter Partnership, Heathlands Farm, Honey Hill, Wokingham, Berks					50			Autumn 2008
	Paul Harold, Sunclose Farm, Butt Lane, Milton, Cambs CB24 6DQ			80	80				
Trade Solutions	Michael Thomson, East Gormack, Blairgowrie, PH12 8UL	175	50						Spring 2007
				100	100	100			Autumn 2008
Summerfruit Company	Tim Morton, Gaskains Ltd, Norham Farm, Selling, Faversham, ME139RL		50	100	100				Autumn 2007
		100				100	10	10	Autumn 2008
ASF	Lochy Porter, Angus Soft Fruit Ltd, East Seaton, Arbroath, DD11 5SD	62	50						Spring 2007
		70		100	65	100			Autumn 2008

Table 25. Trial visits made by Nikki Jennings in 2010

Date	Trial	Address	Contact
Thursday 3rd June	HDC	Rectory Farm, Oxford OX33 1HF	Janet Allen
Friday 25th June	Trade Solutions	Muirton of Alyth Alyth	Pete Marshall
Monday 28th June	ReDeva	Gaskains, Norham Farm, Faversham, ME13 9RL	Lindrea Latham
Monday 28th June	Berryworld	4 Ewell Barn, Graveney Road, Faversham ME13 8UP	Peter Vinson Kate Gibbs
Tuesday 29th June	Hargreaves	Cowpers Gate Spalding PE12 9BS	Jane Fairlie Marie-Laure Martin
Tuesday 29th June	Berryworld	Sunclose Farm, Butt Lane, Milton, Cambridge CB24 6DQ	Paul Harrold Kate Gibbs
Wednesday 21st July	EMR	New Road, East Malling, ME19 6BJ	Feli Fernandez

Table 26. Summary of triallist results

			Yield			Fruit size			Appearance			Flavour			Firmness			Fruit rot			Root rot			Cane disease			Compare with control				
Triallist*	Selection	Control Variety	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Plant more?	Comments
A	0019E-2	Ample		x			x			x			x			x			x			x			x			x		
B	0019E-2	Ample /Tula.	x				x		x			x			x			x			x			x			x			yes	High yield, good flavour and cohesion, nice size fruits, good colour
A	9628E-3	Ample		x			x			x			x			x			x			x			x			x		
B	9628E-3	Ample /Tula.		x				x			x			x		x			x			x			x				x	no	Fruit size - too small. Yield - 2.5kg less in plot than control. Flavour - quite acidic - no balance or sweetness
A	9751E2	Ample		x			x			x			x			x			x			x			x			x		
A	00123A7	Ample		x			x			x			x			x			x			x			x			x		
B	00123A7	Ample /Tula.		x				x	x				x		x				x			x			x						Undecided - smaller fruits than controls
D	00123A7	Glen Doll		x		x					x	x					x		x			x			x			x		maybe	Glen Doll in surrounding field not growing well, so picking of whole field stopped early
A	9455F-2	Ample		x			x			x			x			x			x			x			x			x		
E	9455F-2	Octavia	x			x			x			x			x			x			x			x			x			yes	Meaty, large fruit with good shelf life and flavour. Observation since then supports this. Also have Glen Doll beside it. This variety is much better.
E	9612F2	Octavia	x			x				x		x			x			x			x			x			x			no	We did measure yields in 2004. Quality and yield are good. Flavour not as good as 9455F-2. This year's return based on general observation.

			Yield			Fruit size			Appearance			Flavour			Firmness			Fruit rot			Root rot			Cane disease			Compare with control				
Triallist*	Selection	Control Variety	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Better	Similar	Worse	Plant more?	Comments
B	97134B1	none/ yellow	x					x	x				x			x			x			x			none					Potential yield very high, but berry size very small. No other yellow floricane type in trial at this time so no comparison
A	9764F-3	Ample		x			x			x			x			x			x			x			x			x		Please note that Glen Doll control is not what would be expected. Canes very stunted, low yield and low vigour. Fruit shape - conical. Flavour score 2.6 out of 5. Appearance of fruit 3 out of 5. Fruit colour - dark red
F	9764F-3	Glen Doll	x			x				x				x													x			no	
C	9764F-3	Ample	x				x		x				x			x												x		no	
A	99111A1	Ample		x			x			x			x			x			x			x			x			x			
E	99111B2	Octavia		x				x						x		x			x			x			x				x	no	No yield measurements were made. Yield and size adequate. Flavour is very sharp and not suitable for general variety
A	9911C-1	Ample		x			x			x			x			x			x			x			x			x		

***Key to Triallists**

Triallist

A Angus Soft Fruits
B Hargreaves Plants Ltd
C Edward Vinson Ltd, Berryworld Plus
D Peter Thomson, KG Growers
E Paul Harrold, Berryworld
F Summerfruit Company

APPENDIX: 2 - Photographs

Plate 1 SCRI Selection 0433F2

Plate 2 SCRI Selection 0453C4

Plate 3 SCRI cv. Glen Fyne

Plate 4 SCRI selection 9350F3

Plate 5 SCRI selection 9911C-1

Plate 6 SCRI selection 0019E2

